FIG. 2 are assembled in parallel, as illustrated in FIG. 4, between the differential inputs **47, 49** and the differential outputs **57, 59**. Each of the amplifiers may be selectively controlled, for example, via a controllable current source **45** that conducts the currents from the commonly connected sources in each amplifier. In this way, each of the amplifiers **61, 63, 65** may be selectively disabled or enabled to selectively expand the linear range **55, 55'** of the combined transfer function. In addition, with one or more pairs of differentially connected capacitive components **27, 29** connected across the outputs **57, 59**, the range of frequencies over which the integrated circuit may be operated can be greatly increased, for example, to over 6:1 for operations at about 40 MHz to about 270 MHz. Additionally, for selected values of capacitance C switched into the circuit in the manner previously described, control of one or more of the current sources in the amplifiers **61, 63, 65** may thus be externally controlled to maintain the transconductance (g_m) to capacitance (C) ratio (g_m/C) substantially constant over a population of integrated circuits thus configured, and for operation of a particular integrated circuit with selected frequency response characteristics. Of course, various known semiconductor technologies such as bi-polar or NMOS or CMOS processes may be used to form integrated circuits including amplifiers and capacitive components, as described above.

Therefore, one design of integrated circuit according to the present invention facilitates formation of g_m/C integrators operable over a wide range of frequencies, with dynamic responses conveniently controllable by signals that may be internal or external to the integrated circuit.

What is claimed is:

1. Integrator apparatus comprising:

an amplifier including a pair of outputs and being responsive to differential input signals for producing differential output signals on the pair of outputs; and

a pair of capacitive components connected to the pair of outputs and to a common source of first control signal, the capacitive components including insulated-gate, field-effect transistors having gates connected to respective ones of the pair of outputs and having sources and drains connected in common to receive said first control signal for altering the capacitance of each pair of capacitive component in response to the first control signal applied to the sources and drains thereof.

2. Integrator apparatus according to claim **1** comprising a plurality of pairs of capacitive components, each including insulated-gate, field-effect transistors having gates connected to respective ones on the pair of outputs and having sources and drains connected in common to receive the first control signal therefor for altering the capacitance of the capacitive components in response to the first control signal applied to the sources and drains of each of the plurality of pairs of capacitive components.

3. Integrator apparatus according to claim **2** wherein the amplifier includes a plurality of differential amplifiers, each having a pair of outputs coupled in common to the plurality of pairs of capacitive components, and each having a pair of inputs connected in common to receive applied differential signals, at least one of the plurality of differential amplifiers also having a transfer function from inputs thereof to outputs thereof that is controllable in response to a second control signal applied thereto for altering the combined transfer function of the plurality of differential amplifiers from the inputs thereof connected in common to the differential outputs thereof coupled in common in response to applied second control signal.

4. Integrator apparatus according to claim **1** wherein said amplifier includes a pair of field-effect transistors, each having a drain electrode connected to respective ones of said pair of outputs, and having source electrodes connected in common, with the source and drain electrodes of each transistor forming a conduction channel thereof, and transistors having gate electrodes connected to receive the differential input signals applied thereto to alter the conduction channel thereof; and

a current source connected to the drain electrode of each transistor, and another current source connected to the common connection of the source electrodes for conducting the sum of currents in the conduction channels of the pair of transistors.

5. Integrator apparatus according to claim 4 wherein said another current source is adjustable to alter the transfer function of the amplifier from the gate electrodes to the pair of outputs thereof.

6. Integrator apparatus according to claim 3 wherein the second control signal is adjusted to maintain substantially constant the ratio of the transconductance of the amplifier to the capacitance provided by the capacitive components in response to first control signal applied thereto.

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